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EXAMINER	
RAO, ANAND SHASHIKANT	

ART UNIT	PAPER NUMBER
2613	

DATE MAILED: 01/31/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 10/03)

Office Action Summary	Application No.	Applicant(s)	
	10/664,985	HASKELL ET AL.	
	Examiner	Art Unit	
	Andy S. Rao	2613	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *18 September 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *35-70* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *35-70* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *6/9/05*.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other: _____.

DETAILED ACTION

Specification

1. The specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 44-49, and 52-55 are rejected under 35 U.S.C. 102(b) as being anticipated by Kato.

Kato discloses a method of encoding a video signal (Kato: column 4, lines 33-42), comprising the steps of: organizing video data into blocks (Kato: column 11, lines 30-35) of luminance data and blocks of chrominance data (Kato: column 7, lines 40-50); coding the luminance blocks as DC luminance coefficients (Kato: column 7, lines 40-50; column 8, lines 15-20); coding the chrominance blocks as DC and AC chrominance coefficients (Kato: column 7 lines 40-50; column 16, lines 5-15); quantizing the DC luminance coefficients according to a first transformation of a quantization parameter (Kato: column 15, lines 60-67); quantizing the DC chrominance coefficients according to a second transformation of the quantization parameter (Kato: column 16, lines 30-40); quantizing the AC chrominance coefficients according to a third transformation of the quantization

parameter (Kato: column 16, lines 40-47); and variable length coding the on the quantized coefficients (Kato: column 8, lines 30-40), as in claim 44

Regarding claims 45-46, Kato discloses outputting an identifier of the quantization parameter in a fixed length code (Kato: column 3, lines 20-30), the code representing a change in the quantization parameter with reference to a previous value of the quantization parameter (Kato: column 12, lines 55-67), as in the claims.

Kato discloses a method of decoding an encoded video signal (Kato: column 4, lines 50-60), comprising the steps of: extracting quantized DC luminance coefficients (Kato: column 9, lines 30-50), quantized DC chrominance coefficients (Kato: column 9, lines 55-65), and quantized AC chrominance coefficients from a variable length code (Kato: column 10, lines 1-20); dequantizing the quantized DC luminance coefficients according to a first inverse transformation of a quantization parameter (Kato: column 10, lines 10-20; column 17, lines 55-65); dequantizing the quantized DC chrominance coefficients according to a second inverse transformation of the quantization parameter (Kato: column 17, lines 43-55); dequantizing the quantized AC chrominance coefficients according to a third inverse transformation of the quantization parameter (Kato: column 35-45); transforming the dequantized DC luminance coefficients into blocks of luminance data, transforming the dequantized DC and AC chrominance coefficients into blocks of chrominance data (Kato: column 18, lines 10-25), and combining the luminance and chrominance blocks into a video signal (Kato: column 24, lines 20-45), as in claim 47.

Regarding claims 48-49, Kato discloses extracting from the variable length code a fixed length code (Kato: column 3, lines 20-30) representing a change in the quantization

parameter with reference to a previous value of the quantization parameter (Kato: column 12, lines 55-67), as in the claims.

Regarding claims 52-54, Kato discloses an encoded video signal produced according to the method (Kato: column 6, lines 50-60), as in the claims.

Kato discloses in a video coding system in which encoders and decoders operate upon common quantization parameters (Kato: figures 13 and 18), a method of reporting an update to a quantization parameter (Kato: column 4, lines 30-60), comprising: determining a desired change in the quantization parameter at the encoder (Kato: column 12, lines 55-67), and coding the desired change in a fixed length code (Kato: column 3, lines 20-30), the code representing an index into an update table of permissible quantization parameter changes for a range of current quantization parameters (Kato: figures 6a-6c), as in claim 55.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 35-43, 50-51, and 56-70 rejected under 35 U.S.C. 103(a) as being unpatentable over Kato in view of Azadegan et al., (hereinafter referred to as "Azadegan").

Kato discloses an encoder for encoding video signals (Kato: figure 13), comprising: a processing circuit to generate blocks of video data from a video information signal (Kato: column 11, lines 30-35); a transform circuit (Kato: column 12, lines 50-65) to generate DC luminance coefficients (Kato: column 7, lines 40-47), DC chrominance coefficients (Kato: column 9, lines 30-50), and AC chrominance coefficients for each of said blocks (Kato: column 16, lines 40-46); a quantizer circuit to receive a quantization parameter for each of said blocks (Kato: column 15, lines 60-67; column 16, lines 1-12); scale said luminance coefficients (Kato: column 16, lines 60-65) by a luminance scaling function (Kato: column 7, lines 40-47); scale said chrominance coefficients (Kato: column 12, lines 60-65) by a chrominance scaling function (Kato: column 7, lines 40-47); quantize said luminance according to said luminance scaling function, and chrominance coefficients according said chrominance scaling function transformation of said quantization parameter, each said quantization parameter being a function of a given channel transmission rate and at least one factor that affects number of bits that are allocated to coding said block (Kato: column 7, lines 30-40); and a variable length coder to generate a variable length code based on the quantized luminance and chrominance coefficients (Kato: column 8, lines 30-40), as in claim 35. However, even though Kato discloses using a non-linear quantization with a scaling function (Kato: column 12, lines 65-67), it fails to discloses using an at least three segment piece-wise linear function for the luminance and chrominance scaling functions, as in the claim. Azadegan discloses that for video encoding using a rate quantizer model it is known to use a piece-wise linear scaling function (Azadegan: column 37, lines 35-45; figure 22) in order to ensure that acceptable picture quality is maintained across coding regions

(Azadegan: column 38, lines 10-20). Accordingly, given this teaching, it would have been obvious for one of ordinary skill in the art to incorporate Azadegan's piece-wise linear scaling function for Kato scaling of luminance and chrominance information in order to ensure that acceptable picture quality across coding regions is maintained. The Kato encoder, now incorporating the Azadegan piece-wise linear function, has all of the features of claim 35.

Regarding claim 36, the Kato encoder, now incorporating the Azadegan piece-wise linear function, has said luminance and chrominance scaling functions are independent of variables other than p (Kato: column 7, lines 47-60), as in the claim. Regarding claims 37-39, the Kato encoder, now incorporating the Azadegan piece-wise linear function, has wherein at low values of said quantization parameter both said luminance scaling function and said chrominance scaling function approximate constant scaling functions, at high values of said quantization parameter said luminance scaling function approximates 2 times said quantization parameter, and said chrominance scaling function approximates said quantization parameter (Azadegan: column 37, lines 35-43), as in the claims.

Kato discloses a decoder for decoding encoded video signals (Kato: figure 18), comprising: a variable length decoder to generate quantized video coefficients from variable length code contained within the encoded video signals (Kato: figure 18, element 152), a dequantizer circuit to identify a quantization parameter with each block associated with the encoded video signals (Kato: column 22, lines 50-55) and to dequantize the video coefficients according to the quantization parameter (Kato: column 22, lines 15-27) an inverse transform circuit that derives a DC luminance dequantization parameter from

said quantization parameter, to transform the dequantized video coefficients into blocks of video data (Kato: column 23, lines 55-60), and a processing circuit to generate a video signal from the blocks of video data (Kato: column 24, lines 10-20), as in claim 40. However, even though Kato discloses using a non-linear inverse quantization with a scaling function (Kato: column 13, lines 20-25), it fails to discloses using an at least three segment piece-wise linear function for the luminance and chrominance scaling functions, as in the claim. Azadegan discloses that for video encoding using a rate quantizer model it is known to use a piece-wise linear scaling function (Azadegan: column 37, lines 35-45; figure 22) in order to ensure that acceptable picture quality is maintained across coded regions (Azadegan: column 38, lines 10-20). Accordingly, given this teaching, it would have been obvious for one of ordinary skill in the art to incorporate Azadegan's piece-wise linear scaling function for Kato scaling of luminance and chrominance information in order to ensure that acceptable picture quality across coded regions is maintained. The Kato decoder, now incorporating the Azadegan piece-wise linear function, has all of the features of claim 40.

Regarding claim 41, the Kato decoder, now incorporating the Azadegan piece-wise linear function, has that the encoded video signals contain encoded luminance signals; the variable length decoder to generate quantized luminance coefficients based on the variable length code; the dequantizer circuit to dequantize the luminance coefficients; the inverse transform circuit to generate blocks of luminance data from the luminance coefficients; and the processing circuit to generate a luminance signal from the blocks of luminance data (Kato: column 9, lines 30-50), as in the claim.

Regarding claim 42, the Kato decoder, now incorporating the Azadegan piece-wise linear function, has that the encoded video signals contain encoded DC chrominance signals', the variable length decoder to generate quantized DC chrominance coefficients based on the variable length code; the dequantizer circuit to dequantize the DC chrominance coefficients; the inverse transform circuit to generate blocks of DC chrominance data from the DC chrominance coefficients; and the processing circuit to generate a DC chrominance signal from the blocks of DC chrominance data (Kato: column 9, lines 30-50), as in the claim.

Regarding claim 43, the Kato decoder, now incorporating the Azadegan piece-wise linear function, has that the encoded video signals contain encoded AC chrominance signals; the variable length decoder to generate quantized AC chrominance coefficients based on the variable length code; the dequantizer circuit to dequantize the AC chrominance coefficients; the inverse transform circuit to generate blocks of AC chrominance data from the AC chrominance coefficients; and the processing circuit to generate a AC chrominance signal from the blocks of AC chrominance data (Kato: column 7, lines 40-47; column 16, lines 40-47), as in the claim.

Kato discloses a video coding system (Kato: figures 13 and 18), including: a video encoder comprising: means for generating blocks of video data from a received video signal, transforms the blocks of video data into representative video coefficients (Kato: column 11, lines 30-35), means for quantizing the video coefficients according to a received quantization parameter (Kato: column 15, lines 60-67; column 16, lines 1-12), means for generating an encoded video signal based on the quantized video coefficients (Kato: column 8, lines 30-40), and means for outputting the encoded video signal to a

channel (Kato: column 14, lines 40-60); and a video decoder comprising: means for generating quantized video coefficients from the encoded video signal received from the channel (Kato: figure 18, element 152), means for identifying the quantization parameter (Kato: figure 18, element 155) associated with the encoded video signal (Kato: column 22, lines 50-55), means for dequantizing the quantized video coefficients according to the identified quantization parameter (Kato: column 22, lines 15-27), means for transforming the dequantized video coefficients into blocks of video data (Kato: column 23, lines 10-20), and means for generating a representation of a video signal from the blocks of video data (Kato: column 24, lines 10-20), as in claim 50. However, even though Kato discloses using a non-linear quantization scaling function (Kato: column 12, lines 65-67) and a non-linear inverse quantization scaling function (Kato: column 13, lines 20-27), it fails to discloses using an at least three segment piece-wise linear functions for quantization and inverse quantization the video data, as in the claim. Azadegan discloses that for video coding systems using a rate quantizer model it is known to use a piece-wise linear scaling functions (Azadegan: column 37, lines 35-45; figure 22) in order to ensure that acceptable picture quality is maintained across coding regions (Azadegan: column 38, lines 10-20). Accordingly, given this teaching, it would have been obvious for one of ordinary skill in the art to incorporate Azadegan's piece-wise linear scaling function for Kato's coding system in order to ensure that acceptable picture quality across coding regions is maintained. The Kato coding system, now incorporating the Azadegan piece-wise linear functions, has all of the features of claim 50.

Regarding claim 51, the Kato coding system, now incorporating the Azadegan piece-wise linear functions, has means .for embedding a quantization parameter update in

a fixed length code within the encoded video signal, the code representing a change in the quantization parameter with reference to a previous value of the quantization parameter (Kato: column 3, lines 20-30); and means for updating the quantization parameter based on the quantization parameter update (Kato: column 12, lines 55-67), as in the claim.

Kato discloses decoding method for a coded image data signal (Kato: column 4, lines 34-44), the coded image data signal including data of a plurality of macroblocks and further of a plurality of blocks that are members of the macroblocks (Kato: column 6, lines 30-35), each macroblock including up to four luminance blocks and up to two chrominance blocks, (Kato: column 7, lines 40-47) the method comprising: decoding coded intra macroblock data by (Kato: column 18, lines 20-45): identifying from the signal quantization parameter data for the macroblock (Kato: figure 18, element 155), generating a luminance scalar (Kato: column 10, lines 5-25) according to the quantization parameter (Kato: column 12, lines 55-67), generating a chrominance scalar (Kato: column 10, lines 5-25) according to the quantization parameter (Kato: column 12, lines 55-67), for each of up to four luminance blocks that are members of the macroblock, inverse quantizing a DC coefficient of the luminance block by the luminance scalar (Kato: column 9, lines 55-67), for each of up to two chrominance blocks that are members of the macroblock, inverse quantizing a DC coefficient of the chrominance block by the chrominance scalar (Kato: column 9, lines 30-50), transforming data of the blocks, including the respective inverse quantized DC coefficient, according to an inverse discrete cosine transform (Kato: column 10, lines 5-10), and merging data of the blocks to generate image data of the macroblock (Kato: column 10, lines 15-30), as in claim 56. However, even though Kato discloses using a non-linear inverse quantization with a

scaling function (Kato: column 13, lines 20-25), it fails to discloses using an at least three segment piece-wise linear function for the luminance and chrominance scaling functions, as in the claim. Azadegan discloses that for video encoding using a rate quantizer model it is known to use a piece-wise linear scaling function (Azadegan: column 37, lines 35-45; figure 22) in order to ensure that acceptable picture quality is maintained across coded regions (Azadegan: column 38, lines 10-20). Accordingly, given this teaching, it would have been obvious for one of ordinary skill in the art to incorporate Azadegan's piece-wise linear scaling function for Kato scaling of luminance and chrominance information in order to ensure that acceptable picture quality across coded regions is maintained. The Kato decoding method, now incorporating the Azadegan piece-wise linear function, has all of the features of claim 56.

Regarding claim 57, the Kato decoding method, now incorporating the Azadegan piece-wise linear function, has wherein coded image data signal identities (Kato: column 14, lines 25-35), for at least one macroblock, is a differential update, representing a change in the quantization parameter over a quantization parameter from a previously-coded macroblock (Kato: column 16, lines 20-40), as in the claim.

Regarding claim 58, the Kato decoding method, now incorporating the Azadegan piece-wise linear function, has prior to the inverse quantizing, predicting a scaled DC coefficient of a block according to a gradient prediction analysis (Kato: column 7, lines 30-67), as in the claim.

Regarding claim 59, the Kato decoding method, now incorporating the Azadegan piece-wise linear function, has in response to a first state of a prediction flag (Kato: column 18, lines 20-40), decoding AC coefficient signal in the coded image data signal a

residual signal according to an AC prediction (Kato: column 17, lines 55-67), as in the claim.

Regarding claim 60, the Kato decoding method, now incorporating the Azadegan piece-wise linear function, has responsive to a second state of the prediction flag, decoding the AC coefficient signals according to an inverse discrete cosine transform (Kato: column 17, lines 20-30), as in the claim.

Kato discloses an image coding method (Kato: column 4, lines 33-42), comprising: identifying luminance and chrominance components of an image data signal (Kato: column 7, lines 40-47)), organizing spatial areas of the image data signal into macroblocks and further to blocks (Kato: column 7, lines 20-25), wherein a macroblock includes up to four blocks of luminance data and two blocks of chrominance data (Kato: column 9, lines 30-45), transforming each luminance block and each chrominance block according to a discrete cosine transform, generating DCT coefficient data for each block, for each macroblock (Kato: column 7, lines 25-40): determining a quantizing parameter (Kato: column 12, lines 55-67), generating a luminance scalar based on the quantizing parameter (Kato: column 10, lines 5-25), generating a chrominance scalar based on the quantizing parameter (Kato: column 10, lines 5-25), scaling a DC coefficient of each luminance block according to the luminance scalar (Kato: column 12, lines 60-67), scaling a DC coefficient of each chrominance block according to the chrominance scalar (Kato: column 16, lines 25-40), and transmitting an identifier of the quantization parameter and each scaled DC coefficient via a channel (Kato: column 14, lines 20-50), as in claim 61. However, even though Kato discloses using a non-linear quantization with a scaling function (Kato: column 12, lines 65-67), it fails to discloses using an at least

three segment piece-wise linear function for the luminance and chrominance scaling functions, as in the claim. Azadegan discloses that for video encoding using a rate quantizer model it is known to use a piece-wise linear scaling function (Azadegan: column 37, lines 35-45; figure 22) in order to ensure that acceptable picture quality is maintained across coding regions (Azadegan: column 38, lines 10-20). Accordingly, given this teaching, it would have been obvious for one of ordinary skill in the art to incorporate Azadegan's piece-wise linear scaling function for Kato scaling of luminance and chrominance information in order to ensure that acceptable picture quality across coding regions is maintained. The Kato encoding method, now incorporating the Azadegan piece-wise linear function, has all of the features of claim 61.

Regarding claim 62, the decoding method, now incorporating the Azadegan piece-wise linear function, has wherein the identifier of the quantization parameter for at least one macroblock is a differential update, representing a change in the quantization parameter over a quantization parameter from a previously-coded macroblock (Kato: column 12, lines 55-67; column 13, lines 1-7), as in the claim.

Regarding claim 63, the decoding method, now incorporating the Azadegan piece-wise linear function, has predicting a scaled DC coefficient of a block from a gradient prediction analysis, wherein the identifier of the respective DC coefficient represents results of the prediction (Kato: column 7, lines 45-67), as in the claim.

Regarding claim 64, the decoding method, now incorporating the Azadegan piece-wise linear function, has wherein the discrete cosine transform generates AC coefficients for at least one block, the method further comprising transmitting the AC coefficients of the block (Kato: column 16, lines 10-20), as in the claim.

Regarding claim 65, the decoding method, now incorporating the Azadegan piece-wise linear function, has the discrete cosine transform generates AC coefficients for at least one block, the method further comprising: predicting AC coefficients of the block, generating AC residuals for the block, and transmitting the AC residuals (Kato: column 16, lines 55-67; column 17, lines 1-10), as in the claim.

Regarding claim 66, the decoding method, now incorporating the Azadegan piece-wise linear function, has transmitting a flag signal for a block to indicate whether AC coefficients or AC prediction residual of the block are to be transmitted (Kato: column 18, lines 10-62), as in the claim.

Kato discloses an image coder (Kato: figure 13) comprising: an image preprocessing circuit to identify, from an image signal, luminance and chrominance components thereof and to organize the image signal (Kato: column 7, lines 40-47) into macroblocks and blocks, each macroblock having up to four luminance blocks and up to two chrominance blocks (Kato: column 9, lines 30-45), a DCT circuit, to generate from respective blocks identified by the image preprocessing circuit coefficient data of the blocks according to a discrete cosine transform (Kato: column 7, lines 25-40), and a quantizer to quantize DC coefficients blocks within each macroblock according to a quantization parameter assigned to the macroblock (Kato: column 12, lines 55-67), wherein DC coefficients of luminance blocks are scaled according to the quantization parameter (Kato: column 10, lines 5-25), and DC coefficients of chrominance blocks are scaled according to a second quantization parameter (Kato: column 16, lines 20-45), as in claim 67. However, even though Kato discloses using a non-linear quantization with a scaling function (Kato: column 12, lines 65-67), it fails to discloses using an at least three

segment piece-wise linear function for the luminance and chrominance scaling functions, as in the claim. Azadegan discloses that for video encoding using a rate quantizer model it is known to use a piece-wise linear scaling function (Azadegan: column 37, lines 35-45; figure 22) in order to ensure that acceptable picture quality is maintained across coding regions (Azadegan: column 38, lines 10-20). Accordingly, given this teaching, it would have been obvious for one of ordinary skill in the art to incorporate Azadegan's piece-wise linear scaling function for Kato scaling of luminance and chrominance information in order to ensure that acceptable picture quality across coding regions is maintained. The Kato encoder, now incorporating the Azadegan piece-wise linear function, has all of the features of claim 67.

Regarding claim 68, the Kato encoder, now incorporating the Azadegan piece-wise linear function, a predictor to predict DC coefficient data of the blocks according to a gradient prediction analysis (Kato: column 7, lines 40-67); and a variable length coder coupled to the predictor (Kato: column 8, lines 30-40), as in the claim.

Kato discloses an image decoder (Kato: figure 18), to decode a coded data signal, the signal identifying coded data for a plurality of macroblocks (Kato: column 6, lines 30-35), each macroblock including coded data for up to four luminance blocks and up to two chrominance blocks (Kato: column 7, lines 40-47), the coded data signal including an identifier of a quantization parameter for each macroblock (Kato: figure 18, element 155), the decoder comprising: a scalar to inverse quantize scaled DC coefficients of the blocks (Kato: column 10, lines 5-25), wherein a DC coefficient of each luminance block is inverse quantized according to a luminance scalar generated from the quantization parameter to which the respective luminance block belongs (Kato: column 23, lines 45-

65), wherein a DC coefficient of each chrominance block is inverse quantized according to a chrominance scalar generated from the quantization parameter to which the respective chrominance block belongs (Kato: column 22, lines 15-25), an inverse transform circuit to perform an inverse discrete cosine transform of the blocks (Kato: column 22, lines 40-45), including the inverse quantized DC coefficients (Kato: column 22, lines 15-20), a post-processing circuit to generate reconstructed image data from the inverse transformed block data (Kato: column 22, lines 55-67), as in claim 69. However, even though Kato discloses using a non-linear inverse quantization with a scaling function (Kato: column 13, lines 20-25), it fails to discloses using an at least three segment piece-wise linear function for the luminance and chrominance scaling functions, as in the claim. Azadegan discloses that for video encoding using a rate quantizer model it is known to use a piece-wise linear scaling function (Azadegan: column 37, lines 35-45; figure 22) in order to ensure that acceptable picture quality is maintained across coded regions (Azadegan: column 38, lines 10-20). Accordingly, given this teaching, it would have been obvious for one of ordinary skill in the art to incorporate Azadegan's piece-wise linear scaling function for Kato scaling of luminance and chrominance information in order to ensure that acceptable picture quality across coded regions is maintained. The Kato decoder, now incorporating the Azadegan piece-wise linear function, has all of the features of claim 69.

Regarding claim 70, the Kato decoder, now incorporating the Azadegan piece-wise linear function, has a variable length decoder (Kato: column 23, lines 25-35), and a prediction circuit to predicted the DC coefficient data for the blocks according to a gradient prediction analysis (Kato: column 7, lines 45-67), as in the claim.

Conclusion

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Elfrig discloses an intra-macroblock DC and AC coefficient prediction for interlaced digital video. Schoenblum discloses a hybrid rate control in a digital stream transcoder. Potu discloses a method and system for decoding data encoded in a variable length code word.

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Andy S. Rao whose telephone number is (571)-272-7337. The examiner can normally be reached on Monday-Friday 8 hours.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mehrdad Dastouri can be reached on (571)-272-7418. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Andy S. Rao
Primary Examiner
Art Unit 2613

ANDY RAO
PRIMARY EXAMINER